

**ABSTRACT**

A monitor system and method for characterizing semiconductor processes including ion implantation processes is provided. The system includes a test wafer which has a plurality of sensors formed on its surface. The test wafer may be loaded into the process chamber of a process system and exposed, for example, to an implant. During implantation, electrical signals may be transmitted from the sensor to circuitry external of the chamber to evaluate a variety of ion beam and/or wafer properties. The property data may be displayed in real-time with the implant process so that processing parameters may be adjusted accordingly. The monitor system may be used, in particular, to determine properties related to beam and wafer surface charging which can provide an assessment of the efficiency of beam charge neutralization processes.